



EPA Region 7 TMDL Review

TMDL ID: MO_0159
Document Name: MILL CREEK

State: MO

Basin(s): CUIVRE
HUC(s): 07110008
Water body(ies): MILL CR., MILL CREEK
Tributary(ies):

Pollutant(s): SEDIMENT, TOTAL SUSPENDED SOLIDS

Submittal Date: 5/14/2008

Approved: Yes

Submittal Letter

State submittal letter indicates final Total Maximum Daily Load(s) (TMDL) for specific pollutant(s)/water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act [40 CFR § 130.7(c)(1)]. Include date submitted letter was received by EPA, date of receipt of any revisions, and the date of original approval if submittal is a phase II TMDL.

The TMDL for Mill Creek (159) was formally submitted by the Missouri Department of Natural Resources (MDNR) in a letter received by the United States Environmental Protection Agency (EPA) on May 14, 2008. A revised version was submitted by e-mail attachment on June 18, 2008.

Water Quality Standards Attainment

The water body's loading capacity (LC) for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards (WQS) [40 CFR § 130.7(c)(1)]. A statement that WQS will be attained is made.

The WQS expressed for this waterbody is a narrative value, a measurable indicator of the pollutant may be selected to express the narrative WQS as a numeric value. There are many quantitative indicators of sediment including total suspended solids (TSS), turbidity, and bedload sediment, which are appropriate to describe sediment in rivers and streams. TSS was selected as the numeric target for this TMDL because it enables the use of the highest quality data available, including permit requirements and monitoring data. The LC is defined as a load duration curve (LDC) of TSS over the range of flows for Mill Creek. A reference approach was used to model the LDC for TSS loading as the target of the 25th percentile of the current ecological drainage unit (EDU) condition calculated from all data available within the EDU. This results in a LC of 0.19 tons per day and load allocation (LA) of 0.17 tons per day at the 50th percentile of flow (median flow).

EPA agrees that the LC and associated allocations are set at levels that are adequate for attainment of WQS.

Numeric Target(s)

Submittal describes applicable WQS, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.

Beneficial Uses:

- Livestock and Wildlife Watering

- Protection of Warm Water Aquatic Life
- Protection of Human Health (Fish Consumption)
- Whole Body Contact Recreation - Category B

Listing years:

1998 303(d) list under WBID 2124 and 2002 303(d) list under WBID 0159

The waterbody was mistakenly listed in 1998 as WBID 2124. WBID 0159 is the correct waterbody identification for the Mill Creek addressed by this TMDL.

Length of Impaired Segment: 4 miles

Location of Impaired Segments (downstream to upstream):

Section 7, T50N, R1W (mouth) to Survey 1710, T51N, R1W

Use that is impaired:

Protection of Warm Water Aquatic Life

Standards that apply:

Missouri's WQS at 10 CSR 20-7.031(3) state:

- (A) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;...
- (C) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;...
- (G) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community;...

Since this 303(d) listing, MDNR developed a sediment protocol to determine if sediment is actually the pollutant in the streams listed and to arrive at a standard way to measure sediment. The first step of that protocol is a biological assessment to see if the biological community is actually impaired. However, a biological assessment is not yet available for Mill Creek. For this TMDL, sediment targets were derived using generalized information from the ecological drainage unit (EDU). The TMDL targets the 25th percentile of TSS loads in the EDU over the range of flows for Mill Creek. A description of the process used to derive the target is included in the TMDL.

Pollutant(s) of concern

An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety (MOS) that do not exceed the LC. If submittal is a phase II TMDL there are refined relationships linking the load to WQS attainment. If there is an increase in the TMDL there is a refined relationship specified to validate the increase in TMDL (either load allocation (LA) or waste load allocation (WLA)). This section will compare and validate the change in targeted load between the versions.

In cases where pollutant data for the impaired stream is not available a reference approach is used. In this approach, the target for pollutant loading is the 25th percentile of the current EDU condition calculated from all data available within the EDU in which the waterbody is located. Therefore, the 25th percentile is targeted as the TMDL LDC. TSS measurements taken by MDNR during the summer of 2007 were used to estimate TSS concentrations using relationships developed by Doisey and Rabeni (2004). An established link between TSS and sediment was used to define this TMDL as a numeric value. The WLA, LA, and MOS are set to not exceed the LC.

Source Analysis

Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, nonpoint and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered. If this is a phase II TMDL any new sources or removed sources will be specified and explained.

The major problems are excessive rates of sediment deposition due to streambank erosion and sheet erosion from

agricultural lands, loss of stream length and loss of stream channel heterogeneity due to channelization, and changes in basin hydrology that have increased flood flows and prolonged low flow conditions. A certain level of sediment enters streams through normal processes. Sediment becomes suspended during high flow events as bank soil is eroded and bottom sediment is resuspended. However, human impacts have greatly increased erosion.

The primary cause of sediment impairment has been identified as pollution caused by agricultural nonpoint sources. The majority of the watershed is deciduous forest (39%), cropland (31%), or grassland (23%) where cropland that is next to and drains into Mill Creek could contribute sediment loading. There are no permitted concentrated animal feeding operations (CAFO) in the watershed, there are other livestock that could contribute to sediment loading. This includes Beef cattle (10,880 Animal Units (AU)), Dairy cattle (936 AU), Cow/calf (25,691 AU), Hogs/ Pigs (22,929 AU), Sheep/ Lambs (2,369), and Poultry (Layers not disclosed, Broilers (159 AU)).

Two National Pollutant Discharge Elimination System (NPDES) permitted facilities are located within the watershed, and either have the potential to discharge TSS. Silex Wastewater Treatment Facility (WWTF) discharges with a design flow of 0.03 MGD.

Facility	Permit Number	County	Design Flow (MGD)
Silex WWTF	MO-0108243	Lincoln	0.03
HWR, Tucker Pit	MO-G840023	Lincoln	stormwater

Low intensity urban land use is also calculated to be less than 1% of the land use in the Mill Creek Watershed. It is unlikely that construction activities significantly contribute to the sediment impairment. The submittal demonstrates that all significant sources have been considered.

Allocation - Loading Capacity

Submittal identifies appropriate WLA for point, and load allocations for nonpoint sources. If no point sources are present the WLA is stated as zero. If no nonpoint sources are present, the LA is stated as zero [40 CFR § 130.2 (i)]. If this is a phase II TMDL the change in LC will be documented in this section.

The LC is defined by a LDC set at the 25th percentile of the sediment concentration in the EDU. The LA is set at 90% of the TMDL leaving 10% of the TMDL as a MOS.

WLA Comment

Submittal lists individual WLAs for each identified point source [40 CFR § 130.2(h)]. If a WLA is not assigned it must be shown that the discharge does not cause or contribute to WQS excursions, the source is contained in a general permit addressed by the TMDL, or extenuating circumstances exist which prevent assignment of individual WLAs. Any such exceptions must be explained to a satisfactory degree. If a WLA of zero is assigned to any facility it must be stated as such [40 CFR § 130.2(i)]. If this is a phase II TMDL any differences in phase I and phase II WLAs will be documented in this section.

The WLA for Silex WWTF is set at 0.009 tons/day. The general permit for HWR, Tucker Pit, requires sediment and erosion control sufficient to prevent pollution to waters of the state and to comply with the effluent limitations and other permit conditions. This may require the construction of properly designed sediment basins or other treatment structures or to obtain a site-specific permit. The WLA for HWR, Tucker Pit, is set at current permit conditions plus inclusion of site-specific best management practices (BMP).

Facility	Permit Number	County	WLA
Silex WWTF	MO-0108243	Lincoln	0.009 tons/day
HWR, Tucker Pit	MO-G840023	Lincoln	current permit conditions plus site-specific BMPs.

LA Comment

Includes all nonpoint sources loads, natural background, and potential for future growth. If no nonpoint sources are identified the LA must be given as zero [40 CFR § 130.2(g)]. If this is a phase II TMDL any differences in phase I and phase II LAs will be documented in this section.

The LA is set at 90% of the TMDL leaving 10% of the TMDL as a MOS. For example, at the 50th percentile of flow (median flow) the LC is 0.19 tons/day for this TMDL. Therefore, the LA would be 0.17 tons/day and the MOS is 0.019 tons/day.

Margin of Safety

Submittal describes explicit and/or implicit MOS for each pollutant [40 CFR § 130.7(c)(1)]. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided. If this is a phase II TMDL any differences in MOS will be documented in this section.

The MOS is explicit and is set at 10% of the TMDL. For example, at the 50th percentile of flow (median flow) the LC is 0.19 tons/day for this TMDL. Therefore, the LA would be 0.17 tons/day and the MOS is 0.019 tons/day.

Seasonal Variation and Critical Conditions

Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s) [40 CFR § 130.7(c)(1)]. Critical conditions are factors such as flow or temperature which may lead to the excursion of WQS. If this is a phase II TMDL any differences in conditions will be documented in this section.

The TMDL curve represents flow under all seasonal conditions. The LA and TMDL are applicable at all flow conditions, hence all seasons. The advantage of a load duration curve approach is to avoid the constraints associated with using a single-flow critical condition during the development of a TMDL. Therefore, all flow conditions including seasonal variation are taken into account for TMDL calculations.

Public Participation

Submittal describes required public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s) [40 CFR § 130.7(c)(1)(ii)].

EPA regulations require that TMDLs be subject to public review (40 CFR 130.7). As stated earlier, this water quality limited segment of Mill Creek in Lincoln County is included on the EPA approved 1998 and 2002 303 (d) lists for Missouri. EPA and MDNR's Water Protection Program developed this TMDL. The public notice period was from March 26, 2008 thru April 25, 2008. Groups that received the public notice announcement included the Missouri Clean Water Commission, Missouri Water Quality Coordinating Committee, the affected facilities, 22 Stream Team volunteers in the county, and the two state legislators representing Lincoln County. MDNR also posted the public notice, Sediment TMDL Information Sheet, and TMDL on the MDNR web-site making them available to anyone with access to the Web. No comments were received.

Monitoring Plan for TMDL(s) Under Phased Approach

The TMDL identifies a monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used) [40 CFR § 130.7].

MDNR has scheduled a bioassessment for Mill Creek in fiscal year 2008. MDNR will also routinely examine physical habitat, water quality, invertebrate community, and fish community data collected by the Missouri Department of Conservation (MDC) under its Resource Assessment and Monitoring (RAM) Program. This program randomly samples streams across Missouri on a five to six year rotating schedule.

Reasonable Assurance

Reasonable assurance only applies when less stringent WLAs are assigned based on the assumption of nonpoint source reductions in the LA will be met [40 CFR § 130.2(i)]. This section can also contain statements made by the state concerning the state's authority to control pollutant loads.

Reasonable assurances are not required because there is no required reduction in LA to account for a reduced

WLA. All discharging point sources within the watershed have a WLA sufficient to meet WQS.